**Docket No.: 3108/8**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

**BOX PATENT APPLICATION**

The Commissioner of Patents and Trademarks
Washington, D.C. 20231

Sir:

Transmitted herewith for filing is a **new utility** patent application of: **Mr. Daniel LIU**

Title of Invention:**ELECTRIC ADAPTER WITH DISPLAY UNIT**

Enclosed are:

A specification and 6 claims.

Three(3) sheets of formal drawings (Figs.1-3).

A Combined Declaration and Power of Attorney.

Verified statement to establish **SMALL** Entity Status under 37 CFR § 1.9 and 37 CFR § 1.27. (Ind. Inv.)

An Assignment to: **(N/A)**

The filing fee has been calculated as shown below:

| FOR: | NO. FILED | NO. EXTRA | SMALL ENTITY (RATE) FEE | LARGE ENTITY (RATE) FEE |
|---|---|---|---|---|
| BASIC FEE | | | **$380.00** | $ |
| **TOTAL CLAIMS** | **6** -20 | 0 | ($9) | ($18) |
| **INDEP CLAIM** | **1** - 3 | 0 | ($39) | ($78) |
| 0 MULTIPLE DEPENDENT CLAIMS | | | ($130) | ($260) |
| | | TOTAL | **$380.00** | $ |

**X** A check in the amount of **$380.00** to cover the government filing fee and assignment recordation ( if any ) is enclosed.

**X** The Commissioner is hereby authorized to charge any additional fees associated with this communication, including patent application filing fees and processing fees under 37 CFR 1.16 and 37 CFR 1.17 or credit any overpayment to **Deposit Account No. 04-1447.** A duplicate copy of this paper is enclosed.

Date: December 11, 1998

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Docket: 3108/8

Applicant or Patentee: Daniel Liu
Serial No: Filed Herewith
Filing Date: Filed Herewith
For: Electric Adapter with Display Unit

**VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS (37 CFR 1.9(f) and 1.27(b)) -- INDEPENDENT INVENTOR**

As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for the purposes of paying reduced fees under Section 41(a) and (b) of Title 35, United States Code, to the Patent and Trademark Office with regard to the invention entitled:
Electric Adapter with Display Unit
described in:

(X) the specification filed herewith.
( ) Application Serial No. _____, filed _____.
( ) U.S. Patent No. _____, issued _____.

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

(X) No such person, concern or organization
( ) Persons, concerns or organizations listed below:

FULL NAME:
ADDRESS:
( ) Individual ( ) Small Business Concern

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate (37 CFR 1.28(b)).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon, or any patent to which this verified statement is directed.

| | | | |
|---|---|---|---|
| Inventor's signature | Daniel Liu | Date Signed | NOV. 27. 1998 |
| Full name of inventor | Daniel Liu | | |
| Address | 4F, No.10, Alley 59, Lane 42, Min Chuan Road, Hsin Tien, Taipei Hsien, Taiwan, R.O.C. | | |

# ELECTRIC ADAPTER WITH DISPLAY UNIT

## BACKGROUND OF THE INVENTION

### 1. FIELD OF THE INVENTION

The present invention relates to an adapter for an electric appliance, and more particularly to an electric adapter with display unit mounted on the adapter, capable of displaying various electrical parameters of the electric appliance.

### 2. DESCRIPTION OF THE PRIOR ART

Conventionally, a specific electronic measuring instrument is used to measure a quantity or variable of an electric appliance in order to know the electrical parameter of the electric appliance.

For example, a commercial voltmeter or volt-ohm-milliammeter is generally used to measure the voltage value of an electric socket. Typically, the voltmeter is provided with a scale selecting switch. To measure the voltage level, a proper AC voltage scale must be selected by operating the scale selecting switch, and then a positive testing probe and a negative testing probe plugged into the voltmeter must be carefully inserted into the sockets respectively for performing the voltage measurement. Again for example, when it is desired to know the current passing through an electric appliance, such as a rice cooker, an ampere-meter or a hook type ampere-meter is used to measure the current flow. Such measuring operation can be performed only by those skilled in electric field. For ordinary users or non-professional persons, such work can be hardly done.

Furthermore, it will be more difficult for ordinary users to measure the electrical parameters such as kilowatt-hour, power factor, watt, etc. of the electric appliances.

Thus, it is desirable to provide an improved electric adapter with a display unit which is capable of indicting various electrical parameters of

an electric appliance.

## SUMMARY OF THE INVENTION

Consequently, it is a primary object of the present invention to provide an electric adapter connected between an electric socket and an electric appliance. The electric adapter is equipped with a display unit capable of displaying relevant electrical parameters of an electric appliances.

It is a further object of the present invention to provide an electric adapter with display unit thereon. The electric adapter includes a housing, a plug, an outlet socket, a control circuit and a display unit. The adapter can be directly plugged into an electric socket. The outlet socket of the adapter is used to be plugged by a plug of the electric appliance.

It is still a further object of the present invention to provide an electric adapter with display unit. When an electric appliance plugged on the adapter works, the control circuit of the adapter of the present invention can detect the power parameter of the electric appliance. The display unit mounted on the adapter can display various electrical parameters of the electric appliance, such as voltage value, current value, watt, kilowatt-hour, apparent power value, power factor, etc. The display unit may be designed to normally indicate the present time.

The present invention can be best understood through the following description and accompanying drawings, wherein:

## BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view showing that the electric adapter of the present invention indicates a voltage value on its display unit;

Fig. 2 is a perspective view showing that the electric adapter of the present invention indicates a current value on its display unit; and

Fig. 3 is a circuit block diagram of the control circuit of the present invention.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to Fig. 1, it is a perspective view of the electric adapter 1 in accordance with a preferable embodiment of the present invention. A plug 2 is arranged on the rear side of the electric adapter 1 which can be plugged into an electric socket 7. An outlet socket including three holes 3a, 3b, and 3c is provided on the front panel of the electric adapter 1. A plug of an electric appliance can be plugged into the outlet socket for obtaining a power source via the adapter 1. The outlet socket shown in. Fig. 1 is in a form of known three-hole socket. It may be in a form of two-hole socket as necessary.

The front panel of the adapter 1 includes a display unit 4 which may be a known LED display or LCD display for showing relevant electrical parameters of the electric appliance. In addition, the front panel of the adapter 1 is equipped with a power switch 5 for turning on or off the adapter 1. The front panel is also equipped with a displaying mode selection switch 6 for selectively showing various electric data available on the display unit 4.

In a preferred embodiment of the present invention, the electric data of the electrical parameter of the electric appliance for example includes voltage value, current value, watt, kilowatt-hour, apparent power value, power factor, etc. In the case that no electric appliance is electrically connected to the adapter or the adapter is not activated, the display unit 4 of the adapter may be designed to normally indicate the present time. Each time the displaying mode selection switch 6 is depressed, the display unit 4 will indicate the voltage level, current value, watt, kilowatt-hour, apparent power value, and power factor in sequence. Fig. 1 shows that a voltage value is indicated on the display unit, while Fig. 2 shows that a current value is indicated on the display unit.

Fig. 3 is a circuit block diagram of the control circuit of the present invention. The control circuit is arranged on a circuit board inside the housing of the adapter for detecting the power parameter of the electric

appliance.

In a preferred embodiment of the present invention, the control circuit includes a voltage amplifier 11. The two input ends of the voltage amplifier 11 are connected across the socket holes 3a, 3b of the adapter 1 for detecting the voltage value supplied to the electric appliance ( not shown ).

A voltage zero-crossing detecting circuit 12 is capable of detecting the zero-crossing point of the power source. Each time the value of the alternating current voltage is zero, the zero-crossing detecting circuit 12 will generate an output pulse signal at its output end to a central processing unit 14.

An analog-to-digital converter 13 is used for converting the analog voltage generated by the voltage amplifier 11 into digital signal which is also sent to the central processing unit 14.

The central processing unit 14 is capable of receiving the signals generated by the zero-crossing detecting circuit 12 and the analog-to-digital converter 13, and then calculating and processing the signals and controlling the display unit. The control signals sent from the power on/off switch 5 and displaying mode selection switch 6 are directly sent to the central processing unit 14 for turning on/off the power and selecting the displaying mode of the display unit.

A time base signal generator 15 is used to generate a time base signal which is sent to the central processing unit 15 as a basis clock signal for time calculation and display.

A current amplifier 16 is capable of detecting the value of the current passing through the electric appliance. The current value may be obtained in such a manner that a resistor 16a is serially connected with one of the power wires, and two input ends of the current amplifier 16 are electrically connected across the resistor 16a in parallel.

An analog-to-digital converter 17 is arranged to convert the analog current value generated by the current amplifier 16 into digital signal which is sent to the central processing unit 14.

A power supply 18 obtains a power source from the power wires and

then converting the power source into DC voltage which is output to serve as a working voltage for the control circuit of the present invention.

A display unit 4 arranged on the housing of the adapter for indicating the electrical parameter of the electric appliance.

The voltage amplifier 11, the zero-crossing detecting circuit 12 and the analog-to-digital converter 13 form a voltage detecting circuit of the present invention. The current amplifier 16 and the analog-to-digital converter 17 form a current detecting circuit of the present invention.

According to the above arrangement, when the electric appliance works, the adapter can detect, calculate and process the electrical parameter of the electric appliance. The electrical parameters indicated on the display unit may include voltage value, current value, watt number, kilowatt-hour, apparent power value, power factor, etc. A part of these data are directly displayed by the display unit under control of the central processing unit ( such as voltage value and current value ), while the other of the data are obtained by calculation of the central processing unit according to conventional formulas on the basis of the basic data (such as watt, kilowatt-hour, apparent power value, power factor, etc. ).

It should be noted that the above description and accompanying drawings are only used to illustrate one embodiment of the present invention, not intended to limit the scope thereof. Any modification of the embodiment should fall within the scope of the present invention.

**WHAT IS CLAIMED IS:**

1. An electric adapter connected between an electric socket and an electric appliance, for indicating various electrical parameters of the electric appliance, said electric adapter comprising:
a housing;
a plug arranged on a rear panel of the housing for inserting into an electric socket;
an outlet socket formed on the housing, whereby the electric appliance can be electrically connected to the outlet socket;
a control circuit arranged in the housing for detecting the electrical parameters of the electric appliance during working; and
a display unit arranged on the housing for displaying the electrical parameters received and processed by the control circuit.

2. The electric adapter as claimed in claim 1, wherein the electrical parameters indicated on the display unit comprises present time, voltage value, current value, watt, kilowatt-hour, apparent power value, power factor.

3. The electric adapter as claimed in claim 1, further comprising a power on/off switch arranged on the housing for turning on/off the adapter and a displaying mode selection switch arranged on the housing.

4. The electric adapter as claimed in claim 1, wherein the control circuit comprises:
a voltage detecting circuit for detecting a voltage value supplied to the electric appliance;
a current detecting circuit for detecting a current value supplied to the electric appliance;
a time base signal generator for providing a time base signal;
a central processing unit for receiving the voltage value generated by the voltage detecting circuit and the current value generated by the current

detecting circuit, and calculating the electrical parameters based on the voltage value, current value and time base signal generated by the time base signal generator.

5. The electric adapter as claimed in claim 4, wherein the voltage detecting circuit comprises:

a voltage amplifier electrically connected to the output outlet of the adapter in parallel connection for generating an analog voltage signal;

a voltage zero-crossing detecting circuit for detecting a zero-crossing signal of the analog voltage signal and then sending the zero-crossing signal to the central processing unit; and

an analog-to-digital converter for converting the analog voltage signal generated by the voltage amplifier into a digital voltage value, and then sending the digital voltage value to the central processing unit.

6. The electric adapter as claimed in claim 4, wherein the current detecting circuit comprises:

a current amplifier for detecting a current flow supplied to the electric appliance, and then generating an analog current signal; and

an analog-to-digital converter for converting the analog current signal generated by the current amplifier into a digital current value, and then sending to the central processing unit.

# ELECTRIC ADAPTER WITH DISPLAY UNIT

## ABSTRACT OF THE DISCLOSURE

An electric adapter with a display unit capable of indicating various electrical parameters of an electric appliances is disclosed. The adapter includes a housing, a plug, an outlet socket, a control circuit and a display unit. The adapter is electrically connected between an electric socket and the electric appliance. When the electric appliance works, the control circuit detects various electrical parameters of the electric appliance and then displays the electrical parameters on the display unit. The electrical parameters includes present time, voltage value, current value, watt, kilowatt-hour, apparent power value, power factor.

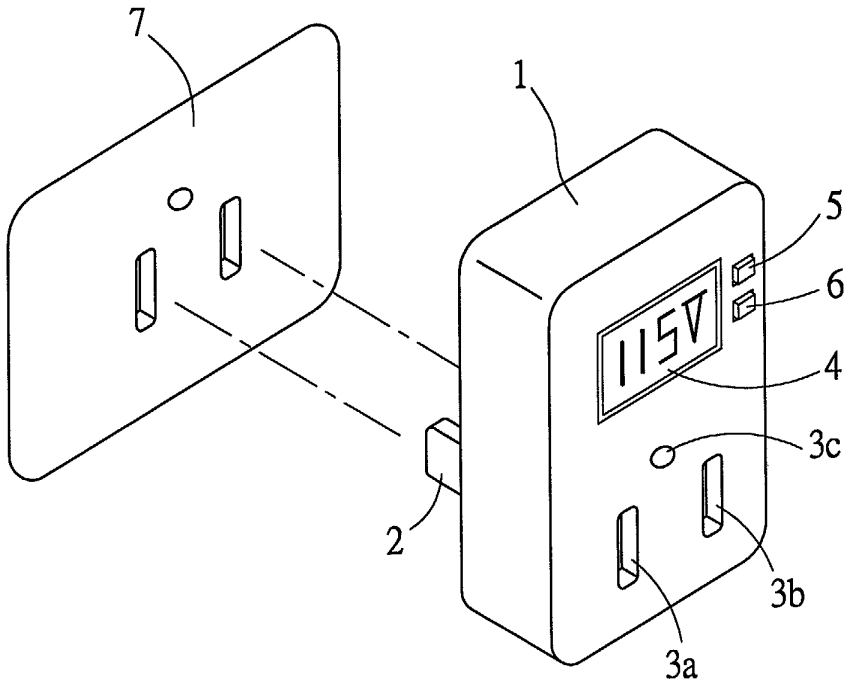


FIG.1

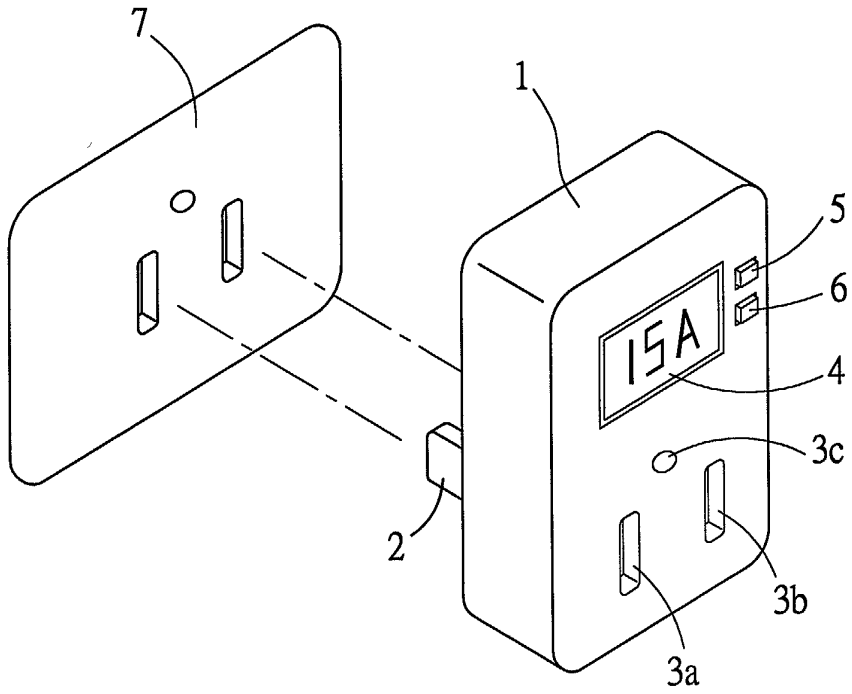


FIG.2

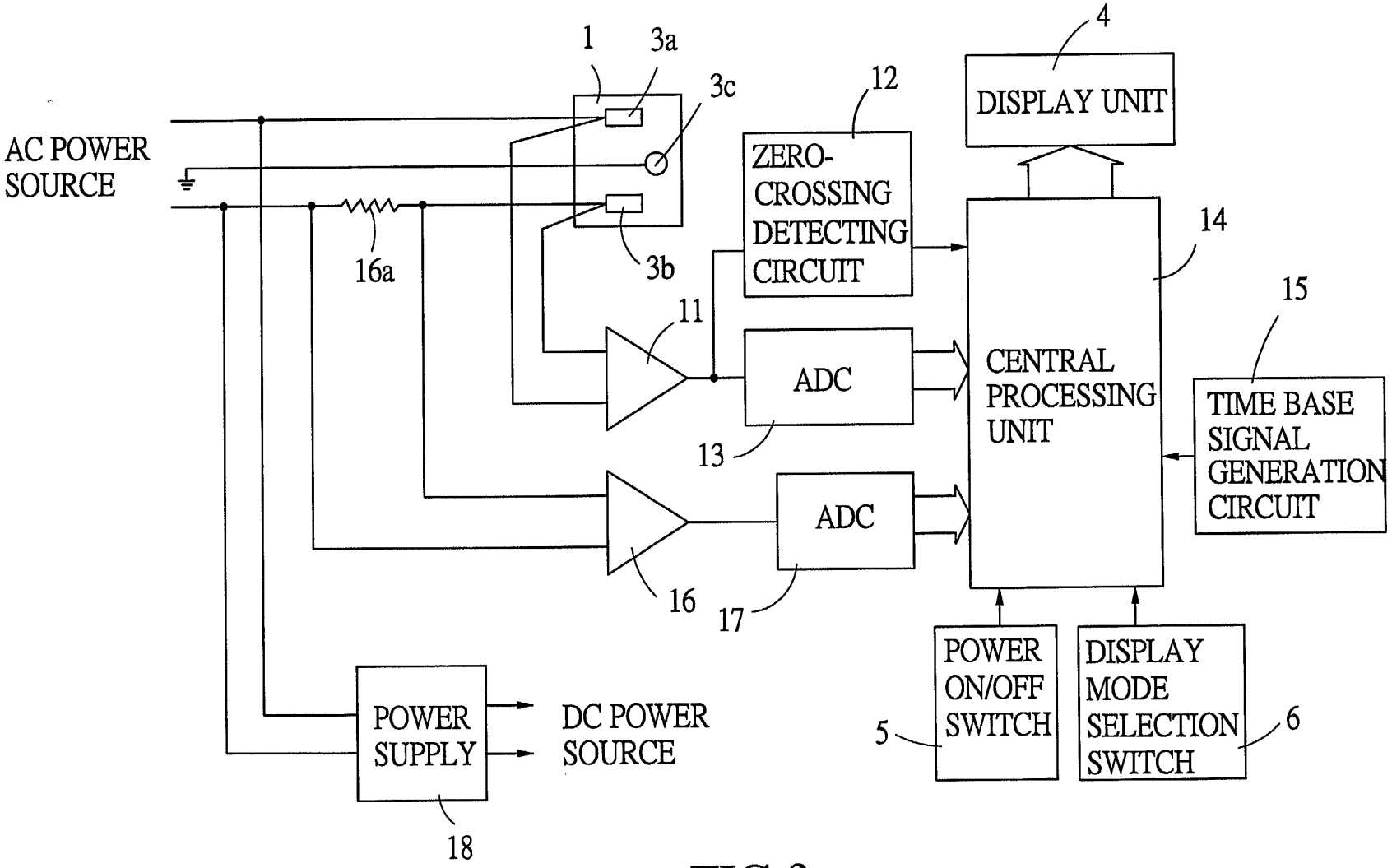
AC POWER SOURCE
1
3a
3c
3b
16a
12
ZERO-CROSSING DETECTING CIRCUIT
4
DISPLAY UNIT
14
15
11
ADC
13
CENTRAL PROCESSING UNIT
TIME BASE SIGNAL GENERATION CIRCUIT
ADC
16
17
POWER SUPPLY
DC POWER SOURCE
18
POWER ON/OFF SWITCH
5
DISPLAY MODE SELECTION SWITCH
6

FIG.3

PATENT
Docket No.: 31088

# DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that the information given below is true, that I believe that I am the original, first and sole inventor if only one name is listed below, or a joint inventor if plural inventors are named below, of the invention entitled:

Electric Adapter with Display Unit

which is described and disclosed in:

(X) the attached specification, or
( ) the specification in Application Serial No. _____, filed _____, or
( ) as amended on _____,

and for which a patent is sought, and that my residence, post office address and citizenship are as stated below next to my name.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, Section 1.56(a).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by the amendment referred to above (if any).

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119 of the following foreign application listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

PRIORITY CLAIM

(X) There is no claim of priority.
( ) Claim of priority is based on the following:

| Country | Appl. No. | Filing Date |
|---|---|---|
| _____ | _____ | _____ |

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application are not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Section 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

| Application Serial No. | Filing Date | Status |
|---|---|---|

PATENT

# DECLARATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As the named inventor, I hereby appoint the following attorney(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith:

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